SIMBIOS Project Activities in Support of MODIS

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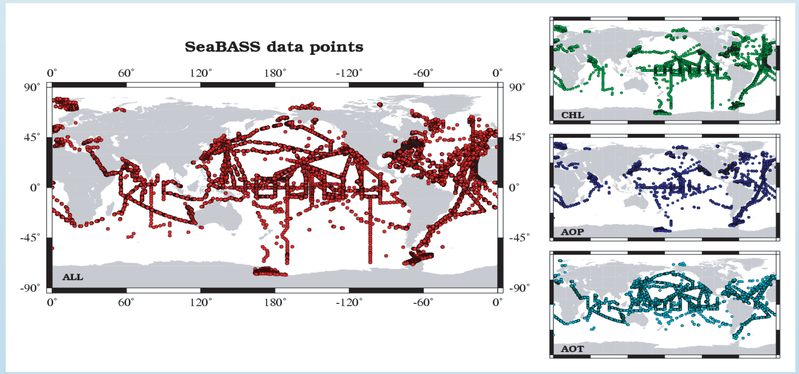
http://simbios.gsfc.nasa.gov

There are now multiple remote sensing satellites in current operation, carrying instruments capable of global ocean color data collection. The NASA SIMBIOS Project, which encompasses both the U.S. and international research communities, is undertaking substantial efforts to assist in the calibration and validation of these instruments. This includes *in situ* bio-optical and atmospheric data collection, algorithm refinement and development, round-robin instrument calibration, and data merger to produce consistent, long term ocean color data sets. This poster will overview the ongoing ocean color remote sensing calibration and validation activities and services provided by the SIMBIOS Project in support of MODIS. These include a description of the SeaBASS *in situ* database, comparison of *in situ* measurements with MODIS products, intercomparison of MODIS and SeaWiFS products, hosting and distribution of SeaWiFS and MODIS diagnostic data sets, production and distribution of merged data products, *in situ* instrument calibration, and MODIS display tool development.

SeaBASS In Situ database

http://seabass.gsfc.nasa.gov



The SIMBIOS Project funds and participates in the collection of *in situ* bio-optical and atmospheric data for ocean color remote sensing validation purposes. The above figure shows the global distribution of all data archived in SeaBASS (part A), chlorophyll a concentrations (part B), aerosol optical thicknesses (part C), and profiles of apparent optical properties (part D), as of January, 2003. In 2002, 97,101 files were downloaded from SeaBASS by the community. 23,448 of these files were downloaded by members of the MODIS team.

Diagnostic Data Set Region Extracts

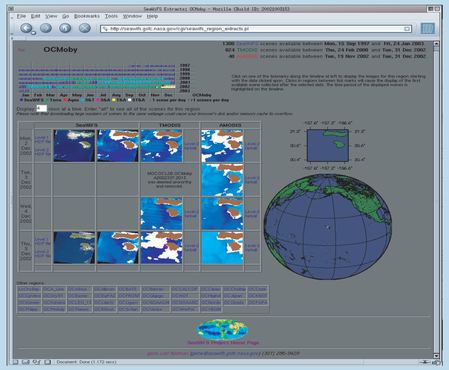
http://seawifs.gsfc.nasa.gov/cgi/seawifs_region_extracts.pl

The SIMBIOS Project is exploring ways to merge ocean color data from multiple sensors into uniform data sets.

Part of this effort is to collect and archive small image segments of specific locations to use as diagnostic data sets.

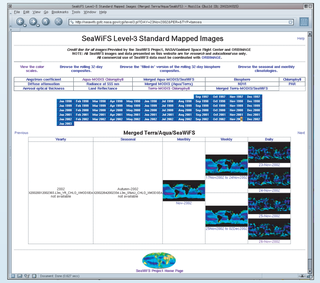
The figure at the right shows the internet browse access to the diagnostic data set at MOBY, containing image segments from both SeaWiFS, MODIS Terra and MODIS Aqua.

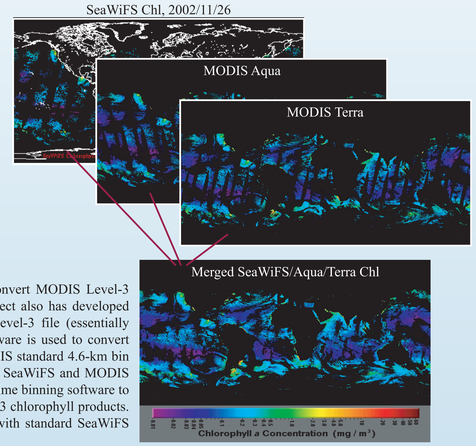
These region extracts are collected at a number of locations of oceanic and terrestrial interest. This includes EOS Core Sites.



SeaWiFS / MODIS Merger

http://simbios.gsfc.nasa.gov/staff/franz/merge/



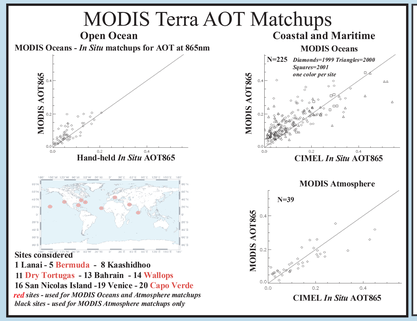


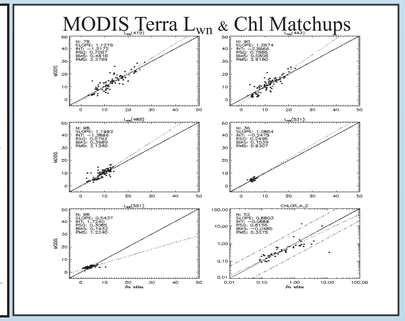
Software was developed by the SIMBIOS Project to convert MODIS Level-3 products to SeaWiFS standard Level-3 format. The Project also has developed software to change the bin resolution of an existing Level-3 file (essentially rebinning a standard bin file). This combination of software is used to convert MODIS daily Level-3 chlor_a_2 products from the MODIS standard 4.6-km bin format to SeaWiFS standard 9-km bin format. The daily SeaWiFS and MODIS 9-km products are then combined via standard SeaWiFS time binning software to produce daily merged MODIS and SeaWiFS 9-km Level-3 chlorophyll products. The merged products can be mapped and/or displayed with standard SeaWiFS utilities (e.g., SeaDAS).

The SIMBIOS Project has implemented an operational processing stream to produce the daily merged chlorophyll products. For each day, the merged product is generated as soon as the MODIS Level-3 daily file becomes available at the DAAC. The resulting bin file is then mapped and images are produced for browsing and distribution.

In Situ Data Matchup

http://seabass.gsfc.nasa.gov/matchup_results.html





The SIMBIOS Project uses archived SeaBASS data to validate ocean color data products from a variety of space-borne sensors, including both MODIS instruments. The results presented above are comparisons of spatially and temporally coincident satellite and *in situ* measurements, informally called match-ups.

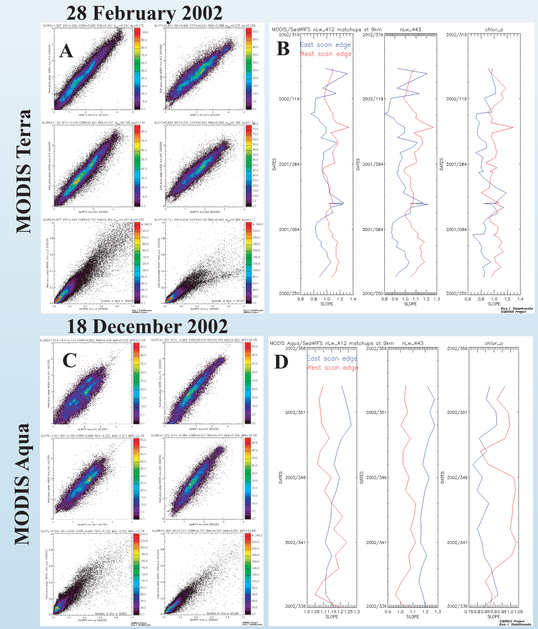
Radiometric Round Robin Intercomparison

http://simbios.gsfc.nasa.gov/RoundRobin/

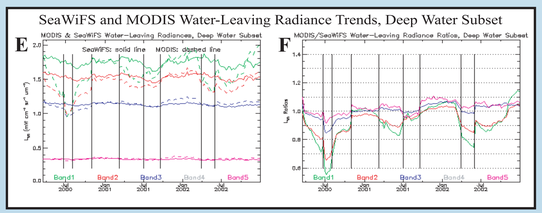
The activities of the SIMBIOS Project Office include calibration round-robin intercomparison experiments. Participating laboratories include academic institutions, government agencies and instrument manufacturers that are involved in oceanographic or atmospheric research programs. The purpose of these comparisons is to measure the light levels used for calibration of field radiometers, and to detect and correct problems at any individual laboratory in a timely fashion. The photograph to the left shows the Goddard Space Flight Center facility used to calibrate the transfer radiometers used to perform radiometric round robin intercomparisons.

SeaWiFS / MODIS Comparison

http://simbios.gsfc.nasa.gov/staff/ewa/SeaMODISTerra/seamodis-terra.html

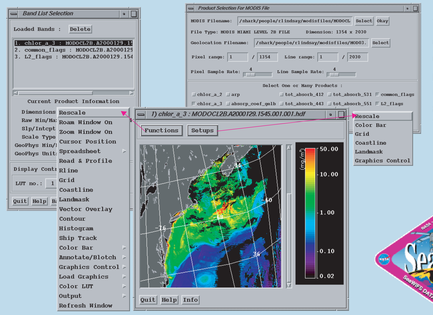


The SIMBIOS Project has undertaken an extensive effort to compare and analyze SeaWiFS and MODIS data. The figures at left show time trends of MODIS data with respect to SeaWiFS data. Figures A, B, E and F are an analysis of MODIS Terra Ocean data, while figures C and D are for MODIS Aqua Ocean data. Figures A and D show scatterplots of the MODIS left and right scan edges with respect to SeaWiFS for the 28th of February, 2002 (Figure A, Terra) and the 18th of December, 2002 (Figure C, Aqua). Time trends for the slope of the linear fit to these scatterplots are shown in figures B and D. Comparisons were performed using geographically defined 'Open Ocean' points with SeaWiFS Reprocessing Version 4 and MODIS Collection 3 'good' (quality level 0) data. Figures E and F show the time trend of MODIS and SeaWiFS Normalized Lw values (E) and ratios (F). Vertical bars represent MODIS Ocean calibration epochs. For more information about this topic, see the poster entitled, "A Comparative Time-Series of Ocean Color Products from MODIS and SeaWiFS," by Bryan A. Franz.



SeaDAS browsing for MODIS

http://seadas.gsfc.nasa.gov



The SeaWiFS Data Analysis System, or SeaDAS, is the comprehensive image analysis package for the processing display, analysis and quality control of SeaWiFS data products. Compatibility has been extended to include a number of other Ocean Color satellites. SeaDAS has the ability to display ocean products from the MODIS Aqua and Terra instruments.